CLAIMS

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1. Apparatus for conveying ice in the form of a plurality of pieces each having physical characteristics amenable to transport by negative air pressure pneumatic conveyance, from a source of said ice to a remote location under said negative air pressure, which comprises:

a hollow elongated ice conduit connecting said source of ice and said remote location and providing ice communication therebetween;

a receptor at said remote location for receiving said ice; and

a vacuum pump in fluid communication through a vacuum line with said receptor for withdrawing air from said conduit and creating a vacuum comprising said negative air pressure in said conduit, said negative air pressure causing said ice to traverse said conduit from said source into said receptor.

2. Apparatus as in Claim 1 wherein said receptor comprises an ice dispensing device.

3. Apparatus as in Claim 2 further comprising said dispensing device having dispensing means for dispensing individual quantities of said pieces of ice to an operator of said dispensing device upon demand of said operator.

4. Apparatus as in Claim 3 further comprising said dispensing device also comprising means for dispensing individual quantities of liquid beverages to said operator of said dispensing device upon demand of said operator.

5. Apparatus as in Claim 2 wherein said ice dispensing device comprises a container from which ice is dispensed into a second conduit providing ice communication between said container and another receptor, whereby said ice may be passed from said container to said another receptor.

6. Apparatus as in Claim 6 wherein said another conduit is oriented such that said ice is motivated through said another conduit by the influence of gravity.

7. Apparatus as in Claim 6 further comprising a vacuum pump in fluid communication through a vacuum line with said container and another conduit for withdrawing air from said container and creating a vacuum comprising said negative air pressure in said another conduit, said negative air pressure causing said ice to traverse said another conduit from said container into said another receptor.

8. Apparatus as in Claim 5 wherein said another receptor comprises another ice dispensing device.

9. Apparatus as in Claim 8 further comprising said dispensing device having dispensing means for dispensing individual quantities of said pieces of ice to an operator of said dispensing device upon demand of said operator.

10. Apparatus as in Claim 9 further comprising said dispensing device also comprising means for dispensing individual quantities of liquid beverages to said operator of said dispensing device upon demand of said operator.

11. Apparatus as in Claim 1 wherein said receptor at said remote location comprises an accumulator having therein an openable gate for release therefrom at said remote location of accumulated pieces of ice conveyed thereto from said source.

12. Apparatus as in Claim 11 wherein said accumulator comprises a hollow ice accumulation chamber with an inlet and an outlet, with said inlet disposed proximate to a outlet of said conduit and with said gate openably closing said outlet, and said gate means being disposed at said outlet such that pieces of ice conveyed into said chamber through said conduit by said vacuum come to rest bearing upon said gate.

13. Apparatus as in Claim 12 further comprising said gate being hingedly affixed to said accumulator and biasing means for biasing said openable gate into close contact with said accumulator and closing said outlet.

14. Apparatus as in Claim 13 wherein said biasing means for biasing said openable gate against opening comprises pneumatic means for biasing said openable gate against opening.

15. Apparatus as in Claim 14 wherein said pneumatic means for biasing said openable gate against opening comprises said vacuum comprising said negative air pressure being maintained within said accumulator by said vacuum pump and creating a pressure differential with ambient air pressure external to said accumulator, said pressure differential biasing said openable gate against opening.

16. Apparatus as in Claim 15 wherein weight of said accumulated pieces of ice in said accumulator exerts pressure against said openable gate greater than and opposed to said pressure differential, thereby biasing said gate open and causing said release of said accumulated pieces of ice.

17. Apparatus as in Claim 15 further comprising vacuum relief means associated with said vacuum line or said conduit for relieving said vacuum in said accumulator and eliminating said pressure differential, thereby allowing said openable gate to open and said accumulated pieces of ice to be released.

18. Apparatus as in Claim 14 further comprising an edge of said outlet of said accumulator comprising a configuration which enhances operation of said pneumatic means for biasing said openable gate.

19. Apparatus as in Claim 18 wherein said outlet of said accumulator is defined by an end of a peripheral wall of said accumulator surrounding said outlet, said end of said wall comprising an interior side of said wall and an

exterior side of said wall joined by a width of said wall, said edge of said outlet comprising a junction line of said width and said interior side, said configuration comprises a chamfer across at least a portion of said width and terminating at an apex of an acute angle at said edge.

20. Apparatus as in Claim 13 wherein said biasing means for biasing said openable gate closed comprises mechanical means for biasing said openable gate against opening.

21. Apparatus as in Claim 20 wherein said mechanical means for biasing said openable gate closed comprises spring means or manually operable closure means exerting biasing pressure against said openable gate, thereby biasing said openable gate against opening.

22. Apparatus as in Claim 21 wherein weight of said accumulated pieces of ice in said accumulator exerts pressure against said openable gate greater than and opposite to said biasing pressure exerted by said spring means, thereby biasing said gate open and causing said release of said accumulated pieces of ice.

23. Apparatus as in Claim 21 wherein said mechanical means for biasing comprises means for alternatively manually activating and deactivating said manually operable closure means, such that when said closure means is activated it exerts biasing pressure against said openable gate, thereby biasing said openable gate against opening, and when said closure means is deactivated its biasing pressure against said openable gate is eliminated, thereby allowing said openable gate to open and said accumulated pieces of ice to be released.

24. Apparatus as in Claim 13 wherein said biasing means for biasing said openable gate closed comprises electrical means for biasing said openable gate against opening.

25. Apparatus as in Claim 24 wherein said electrical means for biasing said openable gate closed comprises solenoid means which exerts biasing pressure against said openable first gate, thereby biasing said openable gate against opening.

26. Apparatus as in Claim 25 further comprising means for electrically activating and deactivating said solenoid means, such that when said solenoid means is activated it exerts biasing pressure against said openable gate, thereby biasing said openable first gate closed, and when said solenoid means is deactivated its biasing pressure against said openable gate is eliminated, thereby allowing said openable gate to open and said accumulated pieces of ice to be released.

27. Apparatus as in Claim 12 further comprising said gate and said outlet being disposed in any spacial orientation which will permit said pieces of ice to be released from said accumulator upon opening of said gate.

28. Apparatus as in Claim 27 further comprising said gate and said outlet being disposed generally vertically.

29. Apparatus as in Claim 11 further comprising said accumulator being disposed in proximity to an ice receptacle and said pieces of ice released from said accumulator being deposited into said receptacle.

30. Apparatus as in Claim 29 wherein said accumulator and said ice receptacle are generally vertically aligned with said accumulator above said ice receptacle such that deposit of said accumulated ice discharged from said accumulator into said ice receptacle comprises said ice being dropped under the influence of gravity.

31. Apparatus as in Claim 29 wherein said accumulator and said ice receptacle are disposed with said accumulator at a level above said ice receptacle but offset laterally therefrom and with a second hollow conduit extending therebetween such that deposit of said accumulated ice discharged from said accumulator into ice receptacle comprises said ice traversing through said second hollow conduit.

32. Apparatus as in Claim 31 wherein traversal of said ice through said second hollow conduit occurs at least in part under the influence of gravity.

33. Apparatus as in Claim 31 wherein traversal of said ice through said second hollow conduit occurs at least in part under the influence of momentum of said ice imparted by motion of said ice.

34. Apparatus as in Claim 29 wherein said second hollow conduit comprises flexible tubing.

35. Apparatus as in Claim 29 wherein said second hollow conduit comprises rigid tubing.

36. Apparatus as in Claim 29 wherein said ice receptacle comprises an ice dispensing device.

37. Apparatus as in Claim 36 further comprising said dispensing device having dispensing means for dispensing individual quantities of said pieces of ice to an operator of said dispensing device upon demand of said operator.

38. Apparatus as in Claim 37 further comprising said dispensing device also comprising means for dispensing individual quantities of liquid beverages to said operator of said dispensing device upon demand of said operator.

39. Apparatus as in Claim 1 or 11 further comprising said vacuum line connecting in fluid communication into said hollow conduit at a first point of connection upstream of a second point of connection of said hollow conduit into said receptor, and spaced apart from said second point of connection by an interval not greater than a distance that said ice pieces can traverse under momentum imparted to them by their prior conveyance by said negative air pressure, such that diversion of at least a portion of conveying force of said negative air pressure at said first point of connection does not prevent said ice pieces from continuing to traverse entirely through said hollow conduit and into said receptor.

40. Apparatus as in Claim 39 further comprising said first point of connection of said hollow conduit and said vacuum line being located in an expanded internal breadth portion of said hollow conduit, such that in said expanded internal breadth portion velocity of air moving under said negative air pressure is diminished relative to velocity of said air in an immediately upstream portion of said hollow conduit.

41. Apparatus as in Claim 39 further comprising said vacuum line and said hollow conduit at said first point of connection being connected at an angle that precludes diversion of said ice pieces from said hollow conduit into said vacuum line.

42. Apparatus as in Claim 39 further comprising said vacuum line at said first point of connection line with said hollow conduit being of a maximum inside width less than minimum breadth of any of said ice pieces, such that diversion of said ice pieces from said hollow conduit into said vacuum line is precluded.

43. Apparatus as in Claim 39 further comprising liquid accompanying said ice and being conveyed therewith, and length of said expanded internal breadth portion of said hollow conduit being sufficiently great that at least a portion of any such liquid being conveyed through said conduit will be diverted into said

vacuum line and will not continue to traverse through said hollow conduit and into said receptor.

44. Apparatus as in Claim 43 further comprising a plurality of liquid traps in said vacuum line downstream from said first point of connection, successive ones of said plurality of liquid traps removing successive quantities of said liquid from entrainment in an air stream moving under said negative air pressure, such that no quantity of said liquid remains entrained in said air stream when said air stream reaches said vacuum pump.

45. Apparatus as in claim 44 wherein a first liquid trap of said plurality of said liquid traps is of a size sufficient to remove all of said liquid from said air stream and a successive one of said plurality of liquid traps comprises a viewing window into said vacuum line to provide for visual confirmation that no liquid reaches said successive one of said plurality of liquid traps.

46. Apparatus as in Claim 11 further comprising a reaccumulator having a inlet and an outlet, disposed exteriorly of and with its said inlet surrounding said inlet of said accumulator, and having an openable door closing its said lower end, such that upon opening of said gate of said accumulator, said ice is discharged into said reaccumulator, and upon completion of said discharge of ice into said reaccumulator said biasing means again biases said gate closed.

47. Apparatus as in Claim 46 further comprising said openable door being hingedly affixed to said reaccumulator and a second biasing means for biasing said openable door into close contact with said reaccumulator and closing said outlet.

48. Apparatus as in Claim 47 wherein said second biasing means for biasing said openable second gate against opening comprises pneumatic means for biasing said openable second gate against opening.

49. Apparatus as in Claim 48 wherein said pneumatic means for biasing said openable door against opening comprises said vacuum comprising said negative air pressure being established in said reaccumulator upon said opening of said openable gate for discharge of said ice into said reaccumulator from said accumulator, said vacuum creating a pressure differential with ambient air pressure external to said reaccumulator, said pressure differential biasing said openable door against opening.

50. Apparatus as in Claim 49 wherein weight of said accumulated pieces of ice in said reaccumulator exerts pressure against said openable door greater than and opposed to said pressure differential, thereby biasing said door open and causing said release of said accumulated pieces of ice.

51. Apparatus as in Claim 49 further comprising closure of said gate of said accumulator relieving said vacuum in said reaccumulator, such that the weight of ice against said door causes said door to open and discharge said ice, such that said apparatus can operate substantially continuously.

52. Apparatus as in Claim 49 wherein said second biasing means for biasing said openable door against opening comprises mechanical means for biasing said openable door against opening.

53. Apparatus as in Claim 52 wherein said mechanical means for biasing said openable door against opening comprises spring means or manually operable closure means exerting biasing pressure against said openable door, thereby biasing said openable door against opening.

54. Apparatus as in Claim 53 wherein weight of said accumulated pieces of ice in said reaccumulator exerts pressure against said openable door greater than and opposite to said biasing pressure exerted by said spring means, thereby biasing said door open and causing said release of said accumulated pieces of ice.

55. Apparatus as in Claim 53 wherein said mechanical means for biasing comprises means for alternatively manually activating and deactivating said closure means, such that when said closure means is activated it exerts biasing pressure against said openable door, thereby biasing said openable door against opening, and when said closure means is deactivated its biasing pressure against said openable door is eliminated, thereby allowing said openable door to open and said accumulated pieces of ice to be released.

56. Apparatus as in Claim 47 wherein said means for biasing said openable second gate against opening comprises electrical means for biasing said openable second gate against opening.

57. Apparatus as in Claim 56 wherein said electrical means for biasing said openable second gate against opening comprises solenoid means which exerts biasing pressure against said openable second gate, thereby biasing said openable second gate against opening.

58. Apparatus as in Claim 57 further comprising means for electrically activating and deactivating said solenoid means, such that when said solenoid means is activated it exerts biasing pressure against said openable second gate, thereby biasing said openable second gate against opening, and when said solenoid means is deactivated its biasing pressure against said openable second gate is eliminated, thereby allowing said openable second gate to open and said accumulated pieces of ice to be released.

59. Apparatus as in Claim 11 or 46 further comprising said receptor being disposed adjacent to an inlet of a subsequent conduit leading to a subsequent accumulator at another remote location, and said pieces of ice released from said receptor being deposited into said inlet for conveyance through said subsequent conduit to said subsequent accumulator at said another remote location.

60. Apparatus as in Claim 59 further comprising another vacuum line in fluid communication with said subsequent conduit for moving said ice through said subsequent conduit to said subsequent accumulator at said second remote location.

61. Apparatus as in Claim 59 further comprising a second receptor disposed at said second remote location, said ice passing from said subsequent accumulator into said second ice receptacle.

62. Apparatus as in Claim 61 wherein said second receptor comprises an ice dispensing device.

63. Apparatus as in Claim 62 further comprising said dispensing device having dispensing means for dispensing individual quantities of said pieces of ice to an operator of said dispensing device upon demand of said operator.

64. Apparatus as in Claim 63 further comprising said dispensing device also comprising means for dispensing individual quantities of liquid beverages to said operator of said dispensing device upon demand of said operator.

65. Apparatus as in Claim 1 or 11 further comprising a collector into which ice pieces delivered from said source of ice are received, said collector having a first opening into said first conduit, and further comprising unbridging means associated with said collector for presenting said released ice pieces individually and unbridged to said first opening, whereby said ice pieces pass through said first opening into said first conduit.

66. Apparatus as in Claim 65 wherein said unbridging means also motivates said ice pieces through said opening into said first conduit.

67. Apparatus as in Claim 65 wherein said unbridging means mechanically breaks ice bridges between individual ice pieces existing when said ice pieces are delivered from said source of ice to said collector.

68. Apparatus as in Claim 67 wherein said unbridging means comprises a toothed wheel, auger, paddle wheel, vibrator, moving blade, converging or parallel pair of belts, air lock closure, ice tumbler or rotating centripetal device.

69. Apparatus as in Claim 67 wherein said unbridging means is disposed vertically, horizontally or at an intermediate angle.

70. Apparatus as in Claim 65 further comprising a second opening from said collector into a second conduit and means for directing said ice pieces alternatively to said first opening or said second opening.

71. Apparatus as in Claim 70 further comprising a storage container adjacent said second opening, said storage container comprising means for retrieval of ice pieces therefrom by manual or mechanical means.

72. Apparatus as in Claim 1 or 11 further comprising sensor means for detecting the presence or absence of ice in said receptor.

73. Apparatus as in Claim 72 wherein said sensor means further determines, when the presence of said ice is detected in said receptor, the quantity of ice so detected.

74. Apparatus as in Claim 73 wherein said sensor means periodically measures a parameter value which is dependent upon said quantity of ice and from which said quantity of said ice can be determined.

75. Apparatus as in Claim 74 wherein said parameter comprises ice weight, ice volume, temperature within said ice receptacle, ice surface level or strain within the body of said receptor.

76. Apparatus as in Claim 74 further comprising:

signal generation means associated with said sensor means for generating a series of signals each of which is determined by the value of a respective one of periodic measurements of said parameter;

comparison means for conversion of each said signal to a respective measure of said quantity of ice in said receptor and comparison of said measure of quantity with a predetermined measure of a desired quantity of said ice in said receptor, said comparison comprising determination of a difference between said quantity of ice in said receptor and said desired quantity of ice at the time of said periodic measurement, said comparison means generating a second signal upon determination that a value of said difference, predetermined to be indicative of presence of less than a minimum acceptable quantity of ice present in said receptor, has been reached;

activation means for ice recharging which is responsive to said second signal and which upon receipt of which activates said apparatus to convey said ice to said receptor until receipt of a subsequent signal from said comparison means, generated upon determination that said predetermined desired quantity of ice in said receptor has been reached, whereupon said activation means in response to receipt of said subsequent signal, deactivates said apparatus and halts conveyance of said ice to said receptor.

77. Apparatus as in Claim 1 or 11 comprising a plurality of said receptors and said conduit having an intermediate division point from which a plurality of branch conduits extend, each branch conduit leading directly or through at least one intermediate further division point from which a subsequent plurality of further branch conduits extend, to an ice communication connection with a respective one of said plurality of receptors.

78. Apparatus as in Claim 77 further comprising a diverter at each said intermediate division point for routing said conveyed pieces of ice into and through any selected one of said plurality of branch conduits at said intermediate division point.

79. Apparatus as in Claim 78 wherein each said diverter further comprises a shifter for aligning said diverter with any selected one of said plurality of branch conduits at said intermediate division point.

80. Apparatus as in Claim 79 wherein said shifter is operated manually, pneumatically, mechanically or electrically.

81. Apparatus as in Claim 78 wherein there are two, three or four alternate branch ice conveyance conduits.

82. Apparatus as in Claim 78 further comprising said vacuum line also having at least one coincident intermediate division point from which an equal plurality of branch vacuum lines extend, each such branch vacuum line forming a pair with a corresponding branch ice conduit and extending to and connecting with a corresponding one of said plurality of receptors, and each said diverter at each said intermediate division point also simultaneously directing said vacuum into and through that branch vacuum line paired with any selected one of said plurality of branch ice conduits.

83. Apparatus as in Claim 82 wherein said diverter further comprises a shifter for motivating routing ice conveyance and direction of vacuum to alternate pairs of corresponding branch ice conveyance conduits and branch vacuum lines.

84. Apparatus as in Claim 83 wherein said shifter is operated manually, pneumatically, mechanically or electrically.

85. Apparatus as in Claim 82 wherein there are two, three or four alternate pairs of corresponding branch ice conduits and branch vacuum lines.

86. Apparatus as in Claim 1 or 11 further comprising a plurality of said sources of ice, a branch ice conduit extending from each and providing ice communication to an intermediate junction point from which a single ice conduit extends and provides ice communication to said receptor, and a diverter at said intermediate junction point, said diverter routing conveyed pieces of ice from any selected one of said plurality of branch conduits into said single ice conduit at said intermediate division point.

87. Apparatus as in Claim 86 wherein said diverter further comprises a shifter for aligning said diverter with any selected one of said plurality of branch conduits at said intermediate division point.

88. Apparatus as in Claim 87 wherein said shifter is operated manually, pneumatically, mechanically or electrically.

89. Apparatus as in Claim 86 wherein there are two, three or four alternate branch ice conduits from said plurality of ice sources.

90. Apparatus as in Claim 86 further comprising said vacuum line also having at least one coincident intermediate division point from which an equal plurality of branch vacuum lines extend, each such branch vacuum line forming a pair with a corresponding branch ice conduit and extending to and connecting with a corresponding one of said plurality of ice sources, and each said diverter at each said intermediate division point also simultaneously directing said vacuum into and through that branch vacuum line paired with any selected one of said plurality of branch ice conduits.

91. Apparatus as in Claim 90 wherein said diverter further comprises a shifter for motivating routing ice conveyance and direction of vacuum from alternate pairs of corresponding branch ice conveyance conduits and branch vacuum lines.

92. Apparatus as in Claim 91 wherein said shifter is operated manually, pneumatically, mechanically or electrically.

93. Apparatus as in Claim 92 wherein there are two, three or four alternate pairs of corresponding branch ice conveyance conduits and branch vacuum lines from said plurality of ice sources.

94. Apparatus as in Claim 1 or 11 wherein said source of ice comprises machinery for making pieces of ice, an ice unbridger, a container having said pieces of ice therein and from which said pieces of ice are motivated into to said ice conduit, another conduit in which said pieces of ice are being conveyed and which is in ice communication with said ice conduit or introducer means for introducing said pieces of ice essentially seriatim into said ice conduit.

95. Apparatus as in Claim 1 or 11 wherein at least a portion of said ice conduit is thermally insulated or refrigerated.

96. Apparatus as in Claim 1 or 11 further comprising filtration means for filtering air being drawn into said ice conduit by said negative air pressure.

97. Apparatus as in Claim 1 or 11 further comprising cleaner introducing means for introducing a liquid cleaner into said ice conduit and conveying said liquid cleaner through said ice conduit under said negative air pressure, whereby passage of said cleaner through said ice conduit cleans contaminants from the interior of said conduit, and upon discharge of said cleaner at an outlet of said conduit, removes from said conduit said contaminants entrained in said cleaner.

98 Apparatus as in Claim 97 wherein said cleaner introducing means is disposed relative to said ice conduit such that said liquid cleaner passes through at least a portion of said ice conduit and at least one of said source of ice and said receptor, such that said contaminants are removed therefrom.

99. Apparatus as in Claim 97 further comprising said vacuum line connecting in fluid communication into said ice conduit at a first point of connection upstream of a second point of connection of said hollow conduit into said receptor, and spaced apart from said second point of connection by an interval not greater than a distance that said liquid cleaner can traverse under momentum imparted thereto them by prior conveyance by said negative air pressure though said conduit, said first point of connection of said first hollow conduit and said vacuum line being located in an expanded internal breadth portion of said first hollow conduit, such that in said portion velocity of air moving under said negative air pressure is diminished relative to velocity of said air in an immediately upstream portion of said first hollow conduit, length of said expanded internal breadth portion of said hollow conduit being sufficiently great that at least a portion of said liquid cleaner being conveyed through said conduit will be diverted into said first vacuum line and a remainder of said liquid cleaner will continue to traverse through said first hollow conduit and into said receptor, whereby passage of said cleaner through said ice conduit and receptor cleans contaminants from the interiors of said conduit and receptor, and upon discharge of said cleaner at an outlet of said receptor, removes from said conduit and receptor said contaminants entrained in said cleaner.

100. Apparatus as in Claim 99 further comprising a plurality of liquid traps in said vacuum line downstream from said first point of connection, successive ones of said plurality of liquid traps removing successive quantities of said liquid cleaner from entrainment in an air stream moving under said negative air pressure, such that no quantity of said liquid cleaner remains entrained in said air stream when said air stream reaches said vacuum pump.

101. Apparatus as in Claim 100 wherein a first liquid trap of said plurality of said liquid traps is of a size sufficient to remove all of said liquid cleaner from said air stream and a successive one of said plurality of liquid traps comprises a viewing window into said vacuum line to provide for visual confirmation that no liquid cleaner reaches said successive one of said plurality of liquid traps.

102. Apparatus as in Claim 1 wherein said receptor at said remote location comprises an air lock device which is connected to said ice conduit on an upstream side and which has an inlet for pressurized air from a source thereof on a downstream side and another conduit extending from said downstream side for passage of said pressurized air, such that ice entering said air lock device from said ice conduit passes through said air lock device and propelled through said another conduit at high velocity by said pressurized air.

103. Apparatus as in Claim 102 wherein that portion of said another conduit downstream of said air lock comprises flexible tubing with an outlet at an end distal from said air lock device.

104. Apparatus as in Claim 103 further comprising directing means for moving said outlet of said flexible tubing such that ice passing through said flexible tubing at high velocity can be projected from said outlet in various directions and to various distances.

105. Apparatus as in Claim 104 wherein said directing means comprises manual, mechanical, pneumatic or electrical positioning of said outlet end of said flexible tubing.

106. Apparatus as in Claim 104 further comprising said directing means causing change of said positioning of said outlet end of said flexible tubing frequently or continually.

107. Apparatus as in Claim 102 wherein said source of pressurized air comprises an air compressor, blower or air exhaust from said vacuum pump.

108. Apparatus as in Claim 1, 11, 29, 46 or 102 wherein operation of said apparatus is at least in part controlled by a microprocessor.

109. Apparatus as in Claim 39 wherein operation of said apparatus is at least in part controlled by a microprocessor.

110. Apparatus as in Claim 59 wherein operation of said apparatus is at least in part controlled by a microprocessor.

111. Apparatus as in Claim 65 wherein operation of said apparatus is at least in part controlled by a microprocessor.

112. Apparatus as in Claim 72 wherein operation of said apparatus is at least in part controlled by a microprocessor.

113. Apparatus as in Claim 77 wherein operation of said apparatus is at least in part controlled by a microprocessor.

114. Apparatus as in Claim 86 wherein operation of said apparatus is at least in part controlled by a microprocessor.

115. Apparatus as in Claim 94 wherein operation of said apparatus is at least in part controlled by a microprocessor.

116. Apparatus as in Claim 95 wherein operation of said apparatus is at least in part controlled by a microprocessor.

117. Apparatus as in Claim 96 wherein operation of said apparatus is at least in part controlled by a microprocessor.

118. Apparatus as in Claim 97 wherein operation of said apparatus is at least in part controlled by a microprocessor.

119. A diverter for simultaneous diversion of ice conveyance and vacuum supply in apparatus as in Claim 82, said diverter comprising an ice conduit and vacuum line first port pair, a plurality of ice conduit and vacuum line second port pairs, and an internal shiftable ice conduit and vacuum line pair, said internal shiftable pair being in continual ice and air communication, respectively, with said first port pair, and being capable of shifting traversal between respective ice and air communication with individual pairs of said plurality of second port pairs.

120. A diverter as in Claim 119 wherein said plurality of second port pairs comprises at least four second port pairs.

121. A diverter as in Claim 119 wherein said shifting traversal is manually, mechanically, pneumatically or electrically motivated.

122. A diverter as in Claim 119 wherein said ports in said port pairs are aligned in a 2xN array, wherein N represents the number of said second port pairs, and at least that portion of said shiftable port pair adjacent to said second port pairs is aligned in correspondence therewith.

123. A diverter as in Claim 122 wherein said plurality of second port pairs comprises two, three or four second port pairs.

124. A diverter as in Claim 119 wherein said ports in said port pairs are aligned in a 1x2N array, wherein N represents the number of said second port pairs, and at least that portion of said shiftable port pair adjacent to said second port pairs is aligned in correspondence therewith.

125. A diverter as in Claim 124 wherein said plurality of second port pairs comprises two second port pairs.

126. A process for conveying ice in the form of a plurality of pieces each having physical characteristics amenable to transport by negative air pressure pneumatic conveyance, from a source of said ice to a remote location under said negative air pressure, which comprises:

a. providing a hollow elongated ice conduit connecting said source of ice and said remote location and providing ice communication therebetween; a receptor at said remote location for receiving said ice; and a vacuum pump in fluid communication through a vacuum line with said receptor for withdrawing air from said conduit and creating a vacuum comprising said negative air pressure in said conduit, said negative air pressure causing said ice to traverse said conduit from said source into said receptor;

b. withdrawing air from said receptor and conduit and creating a vacuum comprising said negative air pressure in said receptor and conduit; and

c. causing said ice to traverse said conduit from said source into said receptor under the influence of said negative air pressure.

127. A process as in Claim 126 wherein said receptor comprises an ice dispensing device, an accumulator or an air lock device.

128. A process as in Claim 127 where said receptor comprises an accumulator, said process further comprising

a. providing an openable gate in said accumulator at said remote location;

b. causing pieces of ice conveyed into said accumulator through said conduit by said vacuum to come to rest bearing upon said gate, said gate being biased against opening; and

c. releasing of accumulated pieces of ice conveyed from said source from said accumulator at said remote location by counteracting or eliminating such biasing.

129. A process as in Claim 128 further comprising creating and counteracting said biasing by manual, mechanical, pneumatic or electrical means.

130. A process as in Claim 129 wherein said biasing is created pneumatically, said process comprising

a. maintaining said vacuum comprising negative air pressure within said accumulator by said vacuum pump and creating a pressure differential with ambient air pressure external to said accumulator, said pressure differential biasing said openable first against opening; and

b. said counteracting such pneumatic biasing by accumulating a sufficient quantity of ice pieces in said first accumulator such that weight thereof exerts pressure against said openable gate greater than and opposed to said pressure differential;

such that said gate is biased open and said accumulated ice pieces are released.

131. A process as in Claim 129 wherein said biasing is created pneumatically, said process comprising

a. maintaining said vacuum comprising negative air pressure within said accumulator by said vacuum pump and creating a pressure differential with ambient air pressure external to said accumulator, said pressure differential biasing said openable gate against opening; and

b. said counteracting such pneumatic biasing comprises relieving said vacuum in said accumulator and eliminating said pressure differential;

such that said openable gate is allowed to open and said accumulated pieces of ice are released.

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132. A process as in Claim 129 wherein said biasing is created mechanically by pressure exerted by spring means and said counteracting such mechanical biasing comprises accumulating a sufficient quantity of ice pieces in said accumulator such that weight thereof exerts pressure against said openable gate greater than and opposed to said pressure exerted by said spring means, such that said gate is biased open and said accumulated ice pieces are released.

133. A process as in Claim 129 wherein said biasing is created mechanically by manually operable closure means exerting biasing pressure against said openable gate and said counteracting such mechanical biasing comprises alternatively manually deactivating said closure means, whereby said openable gate is allowed to open and said accumulated pieces of ice to be released.

134. Apparatus as in Claim 129 wherein said biasing is created electrically by activating solenoid means which exerts biasing pressure against said openable first gate; and said counteracting said electrically created biasing comprises deactivating said solenoid means to eliminate its biasing, such that said openable gate is allowed to open and said accumulated pieces of ice to be released.

135. A process as in Claim 127 wherein said receptor comprises an ice dispenser, said process further comprising thereafter dispensing individual quantities of said pieces of ice to an operator of said ice dispenser upon demand of said operator.

136. A process as in Claim 127 wherein said receptor comprises an accumulator, said process further comprising discharging accumulated ice from said accumulator into an ice dispenser.

137. A process as in Claim 136 further comprising thereafter dispensing individual quantities of said pieces of ice to an operator of said ice dispenser upon demand of said operator.

138. A process as in Claim 126 further comprising

a. connecting said vacuum line in fluid communication into said ice conduit at a first point of connection upstream of a second point of connection of said ice conduit into said receptor, and spaced apart from said second point of connection by an interval not greater than a distance that said ice pieces can traverse under momentum imparted to them by their prior conveyance through said conduit by said negative air pressure; and

b. conveying said ice pieces under that amount of force of said negative air pressure at said first point of connection sufficient to cause said ice pieces to continue to traverse entirely through said first conduit and into said receptor without diversion of any ice pieces into said first vacuum line.

139. A process as in Claim 138 further comprising causing velocity of air at said first point of connection and moving under said negative air pressure to be diminished relative to velocity of said air in an immediately upstream portion of said ice conduit by disposing said first point of connection in an expanded internal breadth portion of said first hollow conduit.

140. A process as in Claim 139 further comprising forming said expanded internal breadth portion of said hollow conduit with a length sufficiently great that one portion of any liquid being conveyed through said conduit will be diverted into said first vacuum line and another portion of said liquid will continue to traverse through said ice conduit and into said receptor.

141. A process as in Claim 140 further comprising disposing a plurality of liquid traps in said vacuum line downstream from said first point of connection and removing successive quantities of said liquid from entrainment in an air stream moving under said negative air pressure in successive ones of said plurality of liquid traps, such that no quantity of said liquid remains entrained in said air stream when said air stream reaches said vacuum pump.

142. A process as in Claim 140 wherein said liquid comprises water.

143. A process as in Claim 140 wherein said liquid comprises a liquid cleaner and said process further comprises introducing said liquid cleaner into said ice conduit, conveying said liquid cleaner through said conduit by said negative air pressure and contacting substantially all interior surfaces of said conduit for removal of contaminants therefrom, such that said interior surfaces are cleaned of said contaminants by passage of said liquid cleaner.

144. A process as in Claim 143 further comprising causing at least a portion of said liquid cleaner also to pass through and contact substantially all interior surfaces of at least one of said source of ice and said receptor, such that such that said interior surfaces are cleaned of said contaminants by passage of said liquid cleaner.

145. A process as in Claim 126 wherein said receptor comprises an ice dispenser and further comprising detecting the presence of ice in said ice dispenser.

146. A process as in Claim 145 further comprising determining the quantity of ice so detected.

147. A process as in Claim 146 wherein said determining comprises periodically measuring a parameter value of said ice dispenser which is dependent upon said quantity of ice contained in said ice dispenser and from which said quantity of said ice can be determined.

148. A process as in Claim 147 wherein said parameter comprises contained ice weight, contained ice volume, temperature within said ice dispenser, ice surface level within said ice dispenser or strain within the body of said ice dispenser.

149. A process as in Claim 146 further comprising determining a desired minimum quantity of ice to be maintained in said ice dispenser, periodically determining said quantity of ice so detected, comparing said quantity of ice detected with said desired minimum quantity of ice, and if said quantity of ice detected is less than said desired minimum quantity of ice, causing sufficient ice to be conveyed to said ice dispenser to increase the quantity of ice present to at least said desired minimum quantity of ice.

150. A process as in Claim 146 further comprising predetermining an incremental quantity of ice to be delivered to said ice dispenser during each conveyance period and causing said incremental quantity to be conveyed to said ice dispenser when determination of said quantity of ice detected indicates that an equivalent incremental quantity of ice has been removed from said ice dispenser since the last previous conveyance of ice to said ice dispenser.

151. A process as in Claim 126 further comprising receiving ice pieces delivered from said source of ice in at least partially bridged condition, and unbridging said ice pieces prior to delivering said ice piece into said ice conduit.

152. A process as in Claim 151 further comprising simultaneously unbridging said ice pieces and motivating said ice pieces toward said ice conduit to which said ice pieces are delivered in unbridged condition.

153. A process as in Claim 151 wherein unbridging comprises mechanically breaking ice bridges between individual ice pieces existing when said ice pieces are delivered from said source of ice to said collector.

154. A process as in Claim 126 wherein said pieces of ice comprise cube ice, flake ice, nugget ice, bridged ice, granular ice, chunk ice or crushed ice.

155. A process as in Claim 126 comprising conveying said ice through a plurality of serially connected conduits to reach said receptor.

156. A process as in Claim 126 comprising forming at least one serial connection between two sequentially aligned conduits through a diverter.

157. A process as in Claim 156 further comprising disposing one of said two sequentially aligned conduits as one of a plurality of conduits which can be alternately connected to the other of said two sequentially aligned conduits through said diverter.

158. A process as in Claim 126 comprising conveying said ice and vacuum through a plurality of paired, serially connected conduits to reach said receptor.

159. A process as in Claim 158 comprising forming at least one serial connection between two sequentially aligned paired ice and vacuum conduits through a diverter.

160. A process as in Claim 159 further comprising disposing one of said two sequentially aligned paired ice and vacuum conduits as one of a plurality of paired ice and vacuum conduits which can be alternately connected to the other of said two sequentially aligned paired ice and vacuum conduits through said diverter.

161. A process as in Claim 160 wherein said plurality of paired ice and vacuum conduits comprises two, three or four paired ice and vacuum conduits.

162. A process as in Claim 127 wherein said receptor comprises an air lock device and said process further comprises providing for said air lock device an air communication connection to a source of pressurized air on a downstream side thereof and ice and air communication with another conduit extending from said downstream side and having an outlet end distal to said air lock device, for passage of said pressurized air, and causing ice to enter said air lock device

from said ice conduit and pass therethrough to encounter pressurized air moving at high velocity on said downstream said and become entrained in said pressurized air moving at high velocity and be propelled through said another conduit and thereby be dispersed at high speed from said outlet end of said another conduit.

163. A process as in Claim 162 further comprising providing as said source of pressurized air an air compressor, a blower or an air exhaust of said vacuum pump.